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(54) **A SUPPORT MEMBER AND METHOD OF SUPPORTING A WALL**

EIN STÜTZELEMENT UND VERFAHREN ZUR STÜTZUNG EINES MAUERS

ELEMENT DE SUPPORT ET PROCEDE POUR SUPPORTER UN MUR

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Description

[0001] The invention relates to a support member and in particular, a support member for, at least partially, supporting a wall.

[0002] Walls constructed from bricks have a maximum length and height to which they can be constructed without requiring additional support to prevent flexing or collapsing of the wall. Conventionally, brick walls have been supported by erecting concrete supports at intervals along the brick wall, both horizontally and vertically, to support the wall. As the brick wall requires to be mechanically tied to the concrete supports, it is conventional practice to use metal rods which are fixed to the cement work of the brick wall and to the concrete supports to tie the brick wall to the concrete supports.

[0003] However, one of the disadvantages of this conventional approach is that the construction and use of concrete supports is both time consuming and labour intensive. In order to form the concrete support it is necessary to construct shuttering to enclose the volume into which the concrete is to be poured. The shuttering is normally constructed from wooden boards and requires the services of a joiner in order to construct the shuttering. In addition, during construction of the shuttering, it is necessary to insert the metal rods, which will be used to tie the brick wall to the concrete support, through the side walls of the shuttering so that the metal rods extend outside the shuttering and into the internal volume of the shuttering where the concrete is to be poured. This requires the services of a steel bender to bend and install the metal rods as required.

[0004] After the shuttering is complete and the metal rods have been inserted, concrete is then poured into the shuttering and permitted to harden before the shuttering is removed. When the shuttering is removed, the metal rods are bonded to the concrete and the brick wall is tied to the concrete supports by the metal rods.

[0005] Hence, the conventional method of supporting brick walls using concrete supports is time consuming, labour intensive and requires the services of three different tradesman (joiner, steel bender and concrete pourer) in addition to a brick layer to construct the wall itself.

[0006] In German patent document DE3602308, a retaining part is used to anchor an external masonry work to a circular beam in the attic region. The retaining part is connected to the circular beam via an anchor rail which only acts to fasten the retaining part to the circular beam. Thus, the masonry work is prone to flexing if built beyond a certain height or length.

[0007] In another German document DE-U1-8632059, a component for a prefabricated wall for connecting a post to a support beam using wire coupling components is disclosed. The arrangement of the post and the support beam forms a framework for supporting panels and is not suitable for supporting a masonry wall.

[0008] In accordance with the present invention, a support member comprises an elongate member having a side wall adapted to be located adjacent an end of a structure to be supported, in use, the side wall including a number of engagement means which permit a tie member to be mounted on the side wall, the tie member having a portion projecting from the side wall to engage with the structure to be supported.

[0009] Preferably, the elongate member may be hollow and typically, has a substantially rectangular cross-section.

[0010] Preferably, the support member further comprises end portions adapted to engage with support surfaces at either end of the elongate member to support the elongate member between the support surfaces.

[0011] Preferably, a number of engagement means are provided at discrete locations along the side wall of the elongate members such that the positions of the tie members are adjustable.

[0012] Typically, the engagement means comprise slots which are preferably substantially parallel to the central longitudinal axis of the elongate member.

[0013] Preferably, the engagement means are provided on opposite sides of the elongate member and preferably on all four sides of the elongate member. This has the advantage of permitting the elongate member to be used to support two different thicknesses of walls if the elongate member has a rectangular cross-section.

[0014] Preferably, the support member is for supporting a brick or stone wall and the tie members are engaged with cement between bricks or stones forming the wall, in use.

[0015] Typically, the tie members are generally L-shaped with one portion of the L engaging with the engagement means on the side wall and the other portion of the L engaging with the wall to be supported.

[0016] Preferably, the support member is adapted to be used to support a wall with the support member in a substantially vertical orientation or in a substantially horizontal orientation.

[0017] Typically, the elongate members are formed from a metal, such as steel.

[0018] An example of a support member in accordance with the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of a brick wall having vertical and horizontal stiffeners to support the wall;

Figure 2 is an enlarged and exploded view of region A of Figure 1 showing the upper end of the vertical stiffener;

Figure 3 is an enlarged and exploded view of region B of Figure 1 showing attachment of a tie to the vertical stiffener;

Figure 4 is an enlarged and exploded view of region C of Figure 1 showing a connector for coupling the horizontal stiffener to the vertical stiffener;

Figure 5 is an enlarged and exploded view of region

D of Figure 1 showing the lower end of the vertical stiffener;

Figure 6 is a perspective view of the tie shown in Figure 3; and

Figure 7 is a perspective view of a connector plate for use with the connector shown in Figure 4.

[0019] Figure 1 shows a section of a wall 1 which is supported by a number of vertical stiffeners 2 (only one shown) which are interconnected by a number of horizontal stiffeners 3 (only two shown). As shown in Figure 1, the vertical stiffener 2 supports three portions 4, 5, 6 of the wall 1 and the vertical edges of the portions 4, 5, 6 adjacent to the vertical stiffener 2 are mechanically connected to the stiffener 2 by means of a number of ties 7.

[0020] The vertical stiffener 2 is connected at each of its upper and lower ends to an upper support surface 8 and to a lower support surface 9, respectively by a connector 10. In addition, each end of the horizontal stiffeners 3 are connected to the side of the vertical stiffener 2 by a connector 11.

[0021] Each of the vertical and horizontal stiffeners 2, 3 comprise a hollow rectangular box section defined by side walls 30, 31. Typically, the side walls 30 are approximately half the width of side walls 31. The side walls 30, 31 each have a number of slots 22, 24 which extend in a direction substantially parallel to the longitudinal axis of the stiffeners 2, 3. Each slot 22, 24 also has a respective opening 45, 46.

[0022] An exploded and enlarged view of the connectors 10 at the upper and lower ends of the vertical stiffener 2 are shown in more detail in Figures 2 and 5. Connectors 10 include a hollow box section 12 defined by two side walls 17, a side wall 18 and two partial side walls 40, 41. From the side wall 18 extends a bent over section 13 and bent over sections 14 extend from the two partial side walls 40, 41. The bent over sections 13, 14 enable a plate 15 to be slid between the bent over sections 13, 14 and ends 16 of the side walls 17. The widths of the side walls 17 and the side wall 18 is less than or equal to the internal dimensions of the vertical stiffener 2 such that the box section 12 may be inserted into the upper and lower ends of the vertical stiffener 2.

[0023] As shown in Figures 2 and 5, the plate 15 has two pairs of holes 19 through which mechanical fastener 42 may be inserted to attach the plate 15 to the underside of the upper support surface 8 and the upper side of the lower support surface 9. The mechanical fasteners 42 are preferably powder actuated fasteners but may, alternatively, be any type of suitable fastener, such as nails, masonry nails or screws.

[0024] An enlarged and exploded view of region B in Figure 1 is shown in Figure 3 where it can be seen that the ties 7 include a planar section 20 which has two lugs 21 formed thereon. The lugs can be inserted through openings 45, 46 to engage with slots 22, 24 in the side wall of the stiffener 2 to attach the tie 7 to the side wall

30. The length of the slots 22, 24 is greater than the length of the lugs 21 to permit movement of the tie 7, and, therefore, adjustment of the position of the tie 7 with respect to the side wall 30. The planar section 20 of the tie 7 is connected to a ribbed section 23. The ribbed section 23 has a rib formation 25. The ribbed section 23 makes an angle of approximately 90° with the planar section 20, such that when the lugs 21 are inserted into the slots 22, the ribbed section 23 of the tie 7 extends substantially perpendicularly to the side wall 30 of the stiffener 2. A rear perspective view of the tie 7 is shown in Figure 6 where it can be seen that the lugs 21 extend both rearwardly and to the side of the planar section 20.

[0025] An enlarged and exploded view of region C of Figure 1 is shown in Figure 4 where the connector 11 is shown in more detail. The connector 11 includes the box section 12 which is identical to the box section 12 used in the connector 10. However, the connector 11 has a plate 26 inserted between the bent over sections 13, 14 (not shown in Figure 4) and the ends 16 of the side walls 17. The plates 26 have four lugs 27, 28 which engage with slots 24, 22 respectively in the side wall 30 of the vertical stiffener 2. The box section 12 fits into the end of the horizontal stiffener 3 so that the connector 11 couples the horizontal stiffener 3 to the vertical stiffener 2.

[0026] The plate 26 is shown in more detail in Figure 7. It can be seen that the plate 26 is symmetrical about a rotation of 180° around an axis through the center of the plate 26 and perpendicular to the surface of plate 26. The lugs 28, 27 are formed by punching out sections of the plate 26 to form the lugs 28, 27 which extend rearwardly behind the plate 26. This permits the rear surface of the plate 26 to be placed against the external surface of the wall 30 and the lugs 28, 27 inserted through the openings 45, 46, respectively to engage in respective slots 22, 24 in the wall 30 to attach plate 26 (and therefore the connector 11) to the vertical stiffener 2.

[0027] In use, the stiffeners 2, 3 are installed by first installing the vertical stiffener 2. The vertical stiffener 2 is installed by inserting connectors 10 into the upper and lower ends of the stiffener 2 and positioning the stiffener 2 where desired. When the stiffener 2 is in the correct position, fasteners 42 are driven through the holes 19 in the plates 15 to secure the connectors 10 to the upper and lower support surfaces 8, 9 and thereby retain the vertical stiffener 2 in the correct position.

[0028] Typically, the length of the vertical stiffener 2 is chosen to be nominally shorter than the height of the vertical gap into which the stiffener has to fit and the depth of the box sections 12 facilitate adjustment to ensure that the combination of the connectors 10 and stiffener 2 extend from the lower support surface 9 to the upper support surface 8. It is not essential that the box section 12 on the upper connector 10 is fully inserted into the upper end of the stiffener 2, it is sufficient that only a portion of the box section 12 is inserted into the upper end of the stiffener 2. Hence, this facilitates ad-

justment of the height of the stiffener 2 to take account differences and tolerances between the designed height of the wall 1 and the actual height of the wall 1.

[0029] After the vertical stiffener 2 has been installed, the wall 1 is constructed and ties 7 are mounted at appropriate intervals (typically every third or fourth layer of bricks) on the side walls 30 of the vertical stiffener 2 such that the ribbed section 23 is mechanically locked to the wall 1 by the ribbed portion 23 being located between layers of bricks and held by the cement between the layers. When the lower portions 4, 5 are constructed to a level where the horizontal stiffener 3 is required, the last layer of bricks is completed except for the two end bricks adjacent the vertical stiffener. The connectors 11 are inserted into each end of a horizontal stiffener 3 and the lugs in the plate 26 of the connectors 11 are inserted into the slots 22, 24 in the side walls 30 of adjacent vertical stiffeners 2 to mount the horizontal stiffener above the last layer of bricks. Each end brick is then laid. Continuation of construction of the wall 1 above the horizontal stiffener 3 then continues by construction of the wall portion 6 above the stiffeners 3, with ties 7 inserted along the side 30 of the stiffener 2 at appropriate intervals to engage between the adjacent layers of bricks to tie the wall portion 6 to the vertical stiffener 2.

[0030] Accordingly, the invention has the advantage that provision of a metal stiffener onto which ties may be mounted, makes installation of the stiffeners 2, 3 more straightforward than the conventional method of using concrete stiffeners. It also has the advantage of reducing the need for a number of different tradesman being required to construct and erect the stiffener.

[0031] The use of slots 22, 24 has the advantage of permitting vertical adjustment of the ties 7 with respect to the stiffeners 2, 3 and vertical adjustment of the horizontal stiffeners 3 to the vertical stiffeners 2. The adjustment is further enhanced by the distribution of a number of slots 22, 24 across the surfaces of the side walls 30, 31.

[0032] In addition, as the side wall 31 is twice the width of the side wall 30, by using the ties 7 on the side wall 31 permits the stiffeners 2, 3 to be used to support a thicker wall. Hence, the stiffeners 2, 3 can be used to support two different wall thicknesses.

[0033] The slots also have the advantage of aiding adhesion of plaster to the stiffeners 2, 3 by helping the plaster to key to the metal surface. In addition, the recessed nature of the side walls 30, by making the separation of the side walls 30 less than the width of the side walls 31, also aids retention of plaster on to the side walls 30. This is less critical on the side walls 31, as the side walls 31 are narrower. However, the side walls 31 could also be recessed if desired.

Claims

1. Support apparatus for supporting a masonry wall

(4,5,6), the apparatus comprising an elongate member (2,3) having a side wall (30,31) adapted to be located adjacent and facing an end of the masonry wall (4,5,6) to be supported, in use, said side wall (30,31) including a plurality of engagement means (22,24), and a plurality of tie members (7) arranged to be mounted on said side wall (30,31) via the engagement means (22,24), each tie member (7) having a portion (23) arranged to project from said side wall (30,31), to engage with the masonry wall (4,5,6) to be supported, **characterised in that**, the engagement means (22,24) are provided at discrete locations along the longitudinal direction of the side wall (30,31) of the elongate member (2,3).

2. Support apparatus according to claim 1, wherein the elongate member (2,3) is hollow.
3. Support apparatus according to claim 1 or claim 2, wherein the elongate member (2,3) has a substantially rectangular cross-section.
4. Support apparatus according to any of the preceding claims, and further comprising first end portions (10) adapted to engage with support surfaces (8,9) at either end of the elongate member (2,3) to support the elongate member (2,3) between the support surfaces (8,9), in use.
5. Support apparatus according to any of the preceding claims, wherein the engagement means (22,24) comprises a slot.
6. Support apparatus according to claim 5, wherein the slot (22,24) is substantially parallel to the central longitudinal axis of the elongate member (2,3).
7. Support apparatus according to any of the preceding claims, wherein the tie member (7) comprises a first portion (20) adapted to engage with the engagement means (22,24) and a second portion (23) adapted to project from the side wall (30,31) of the elongate member (2,3) when the first portion (20) is engaged with the engagement means (22,24).
8. Support apparatus according to claim 7, wherein the first and second portions (20,23) form a generally "L" shape.
9. Support apparatus according to claim 7 or claim 8 when dependent on claim 5 or claim 6, wherein the first portion (20) of the tie member (7) comprises a formation (21) which is adapted to engage with the slot (22,24).

10. Support apparatus according to any of the preceding claims, wherein the engagement means (22,24) are provided in each side wall (30,31) of the elongate member (2,3).
11. Support apparatus according to any of the preceding claims further comprising a further elongate member (2,3), and an end portion (11) adapted to engage with engagement means (22,24) on a first one (2) of the elongate members to support a second one (3) of the elongate members in a substantially horizontal orientation in use when the first one (2) of the support members is in a substantially vertical orientation in use.
12. A method of supporting a masonry wall (4,5,6), the method comprising the steps of:

locating a side wall (30,31) of an elongate member (2,3) adjacent and facing an end of a masonry wall (4,5,6) to be constructed, the side wall (30,31) including a plurality of engagement means (22,24) provided at discrete locations along a longitudinal direction of the side wall (30,31) of the elongate member (2,3); constructing the masonry wall (4,5,6); and mounting a plurality of tie members (7) on the side wall (30,31) via the engagement means (22,24); each tie member (7) having a portion (23) projecting from the side wall (30,31) and which is located between layers of masonry as the said wall (30,31) is being constructed.

Patentansprüche

1. Stützvorrichtung zum Abstützen einer Mauerwerkswand (4, 5, 6), umfassend ein längliches Bauteil (2, 3) mit einer Seitenwandung (30, 31), die geeignet ist, im Einsatz benachbart und gegenüber einem Ende der zu stützenden Mauerwerkswand (4, 5, 6) angeordnet zu werden, wobei die Seitenwandung (30, 31) eine Vielzahl an Eingriffsmitteln (22, 24) umfasst, und eine Vielzahl an Verbindungsteilen (7), die ausgebildet sind, um an der Seitenwandung (30, 31) über die Eingriffsmittel (22, 24) befestigt zu werden, wobei jedes Verbindungsteil (7) einen Abschnitt (23) besitzt, der ausgebildet ist, um von der Seitenwandung (30, 31) abzustehen, um mit der zu stützenden Mauerwerkswand (4, 5, 6) in Eingriff zu gelangen, **dadurch gekennzeichnet, dass** die Eingriffsmittel (22, 24) an diskreten Stellen entlang der Längsrichtung der Seitenwandung (30,31) des länglichen Bauteils (2, 3) angeordnet sind.

2. Stützvorrichtung gemäß Anspruch 1, wobei das längliche Bauteil (2, 3) hohl ist.
3. Stützvorrichtung gemäß Anspruch 1 oder Anspruch 2, wobei das längliche Bauteil (2, 3) einen im Wesentlichen rechteckigen Querschnitt aufweist.
4. Stützvorrichtung gemäß einem der voranstehenden Ansprüche, und ferner umfassend erste und zweite Abschnitte (10), die geeignet sind, um mit Stützflächen (8, 9) an beiden Enden des länglichen Bauteils (2, 3) in Eingriff zu gelangen, um das längliche Bauteil (2, 3) während des Einsatzes zwischen den Stützflächen (8, 9) abzustützen.
5. Stützvorrichtung gemäß einem der voranstehenden Ansprüche, wobei die Eingriffsmittel (22, 24) einen Schlitz umfassen.
6. Stützvorrichtung gemäß Anspruch 5, wobei der Schlitz (22, 24) im Wesentlichen parallel zu der mittleren Längsachse des länglichen Bauteils (2, 3) verläuft.
7. Stützvorrichtung gemäß einem der voranstehenden Ansprüche, wobei das Verbindungsteil (7) einen ersten Abschnitt (20), der geeignet ist, um mit den Eingriffsmitteln (22, 24) in Eingriff zu gelangen, und einen zweiten Abschnitt (23) umfasst, der geeignet ist, um von der Seitenwandung (30, 31) des länglichen Bauteils (2, 3) abzustehen, wenn der erste Abschnitt (20) mit den Eingriffsmitteln (22, 24) sich im Eingriff befindet.
8. Stützvorrichtung gemäß Anspruch 7, wobei die ersten und zweiten Abschnitte (20, 23) im Allgemeinen eine "L"-Form bilden.
9. Stützvorrichtung gemäß Anspruch 7 oder Anspruch 8 in Abhängigkeit von Anspruch 5 oder Anspruch 6, wobei der erste Abschnitt (20) des Verbindungsteils (7) eine Struktur (21) aufweist, die geeignet ist, um mit dem Schlitz (22, 24) in Eingriff zu gelangen.
10. Stützvorrichtung gemäß einem der voranstehenden Ansprüche, wobei die Eingriffsmittel (22, 24) in jeder Seitenwandung (30, 31) des länglichen Bauteils (2, 3) angeordnet sind.
11. Stützvorrichtung gemäß einem der voranstehenden Ansprüche, ferner umfassend ein weiteres längliches Bauteil (2, 3) und einen Endabschnitt (11), der geeignet ist, um mit den Eingriffsmitteln (22, 24) eines Ersten (2) der länglichen Bauteile in Eingriff zu gelangen, um ein Zweites (3) der länglichen Bauteile während des Einsatzes in einer im Wesentlichen horizontalen Ausrichtung abzustützen, wenn sich das Erste (2)

der Stützbauteile während des Einsatzes in einer im Wesentlichen vertikalen Ausrichtung befindet.

12. Verfahren zum Abstützen einer Mauerwerkswand (4, 5, 6), wobei das Verfahren die folgenden Schritte umfasst:

Anordnen einer Seitenwandung (30, 31) eines länglichen Bauteils (2, 3) benachbart und gegenüber einem Ende einer zu errichtenden Mauerwerkswand (4, 5, 6), wobei die Seitenwandung (30, 31) eine Vielzahl an Eingriffsmitteln (22, 24) umfasst, die an diskreten Stellen entlang einer Längsrichtung der Seitenwandung (30, 31) des länglichen Bauteils (2, 3) angeordnet sind; Errichten der Mauerwerkswand (4, 5, 6); und Befestigen einer Vielzahl an Verbindungsteilen (7) an der Seitenwandung (30, 31) über die Eingriffsmittel (22, 24); wobei jedes Verbindungs- teil (7) einen Abschnitt (23) aufweist, welcher von der Seitenwandung (30, 31) absteht und welcher zwischen Mauerwerksschichten während der Errichtung der Wand (30, 31) angeordnet wird.

Revendications

1. Dispositif de soutien pour soutenir un mur de maçonnerie (4, 5, 6), l'appareil comprenant un élément allongé (2, 3) ayant une paroi latérale (30, 31) destinée à être placée à côté et en face d'une extrémité du mur de maçonnerie (4, 5, 6) à soutenir pendant l'utilisation, ladite paroi latérale (30, 31) comprenant une pluralité de moyens de prise (22, 24), et une pluralité de tirants (7) agencés pour être montés sur ladite paroi latérale (30, 31) à l'aide des moyens de prise (22, 24), chaque tirant (7) comportant une partie (23) agencée pour déborder de ladite paroi latérale (30, 31) pour venir en prise avec le mur de maçonnerie (4, 5, 6) à soutenir, **caractérisé en ce que** les moyens de prise (22, 24) sont prévus à des emplacements discrets le long de la direction longitudinale de ladite paroi latérale (30, 31) de l'élément allongé (2, 3).
2. Dispositif de soutien selon la revendication 1, dans lequel l'élément allongé (2, 3) est creux.
3. Dispositif de soutien selon la revendication 1 ou 2, dans lequel l'élément allongé (2, 3) a une section transversale sensiblement rectangulaire.
4. Dispositif de soutien selon l'une quelconque des revendications précédentes et comprenant, en outre,

des premières parties d'extrémité (10) destinées à venir en prise avec des surfaces de soutien (8, 9) à l'une ou l'autre des extrémités de l'élément allongé (2, 3) pour soutenir l'élément allongé (2, 3) entre les surfaces de soutien (8, 9) pendant l'utilisation.

5. Dispositif de soutien selon l'une quelconque des revendications précédentes, dans lequel les moyens de prise (22, 24) comprennent une fente.
6. Dispositif de soutien selon la revendication 5, dans lequel la fente (22, 24) est sensiblement parallèle à l'axe longitudinal médian de l'élément allongé (2, 3).
7. Dispositif de soutien selon l'une quelconque des revendications précédentes, dans lequel le tirant (7) comprend une première partie (20) destinée à venir en prise avec les moyens de prise (22, 24) et une seconde partie (23) destinée à déborder de la paroi latérale (30, 31) de l'élément allongé (2, 3) lorsque la première partie (20) est en prise avec les moyens de prise (22, 24).
8. Dispositif de soutien selon la revendication 7, dans lequel la première et la seconde partie (20, 23) forment une forme généralement en "L".
9. Dispositif de soutien selon la revendication 7 ou la revendication 8 lorsqu'elles dépendent de la revendication 5 ou de la revendication 6, dans lequel la première partie (20) du tirant (7) comprend une structure (21) qui est destinée à venir en prise avec la fente (22, 24).
10. Dispositif de soutien selon l'une quelconque des revendications précédentes, dans lequel les moyens de prise (22, 24) sont prévus dans chaque paroi latérale (30, 31) de l'élément allongé (2, 3).
11. Dispositif de soutien selon l'une quelconque des revendications précédentes, comprenant, en outre, un autre élément allongé (2, 3) et une partie d'extrémité (11) destinée à venir en prise avec les moyens de prise (22, 24) sur un premier (2) des éléments allongés pour soutenir un deuxième (3) des éléments allongés orienté sensiblement horizontalement pendant l'utilisation lorsque le premier (2) élément de soutien est orienté sensiblement verticalement pendant l'utilisation.
12. Procédé pour soutenir un mur de maçonnerie (4, 5, 6), le procédé comprenant les étapes de :

placement d'une paroi latérale (30, 31) d'un élément allongé (2, 3) à côté et en face d'une extrémité du mur de maçonnerie (4, 5, 6) à construire, la paroi latérale (30, 31) comprenant une pluralité de moyens de prise (22, 24) prévus à

des emplacements discrets le long de la direction longitudinale de la paroi latérale (30, 31) de l'élément allongé (2, 3) ; construction du mur de maçonnerie (4, 5, 6) ; et montage d'une pluralité de tirants (7) sur la paroi latérale (30, 31) à l'aide des moyens de prise (22, 24) ; chaque tirant (7) comportant une partie (23) qui déborde de la paroi latérale (30, 31) et qui est placée entre des couches de maçonnerie au fur et à mesure de la construction dudit mur (4, 5, 6).

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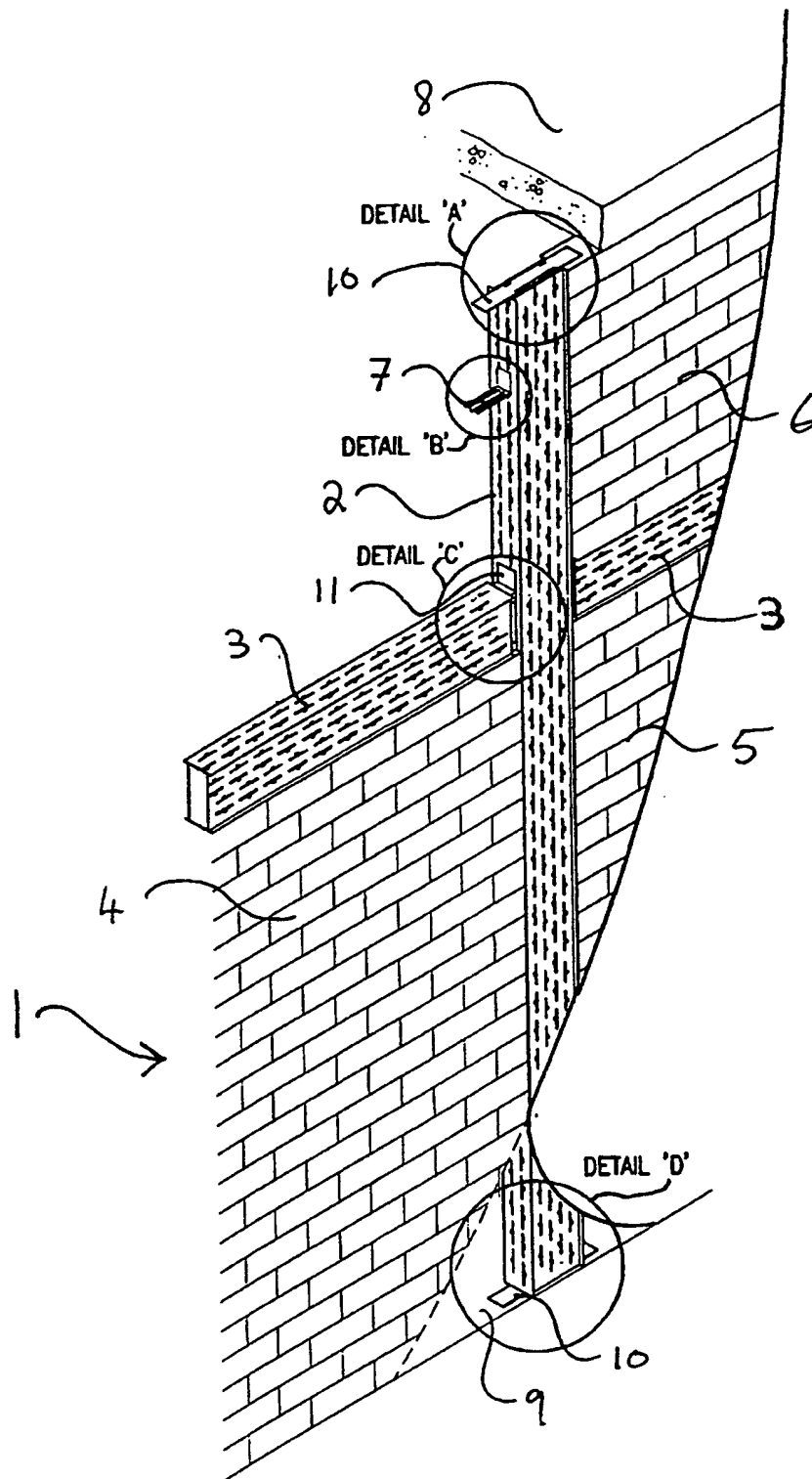


Figure 1

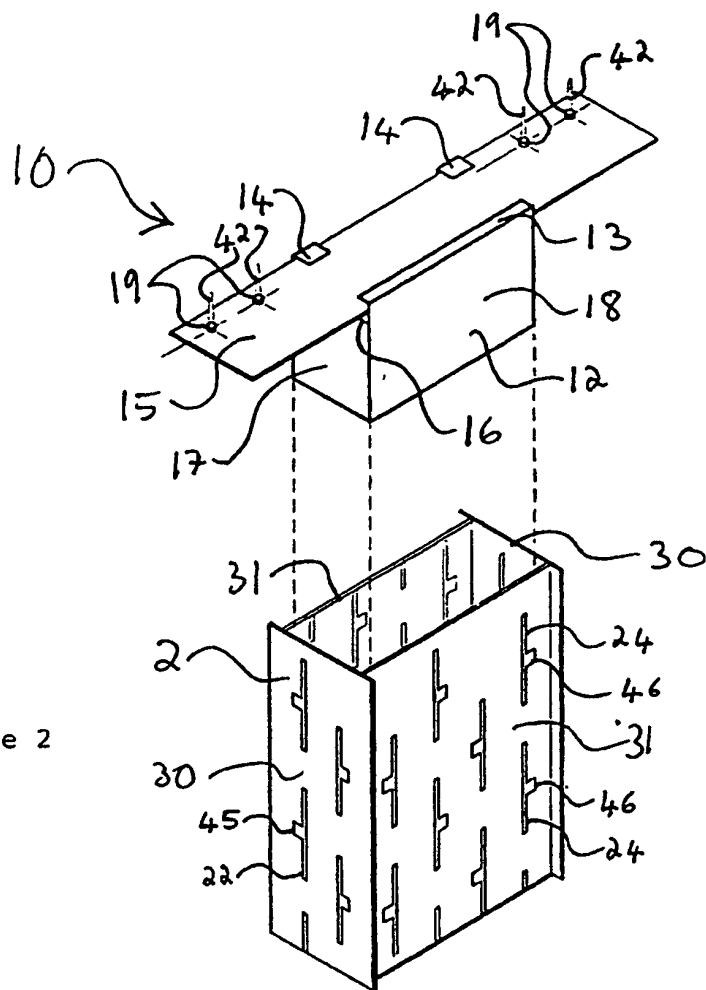


Figure 2

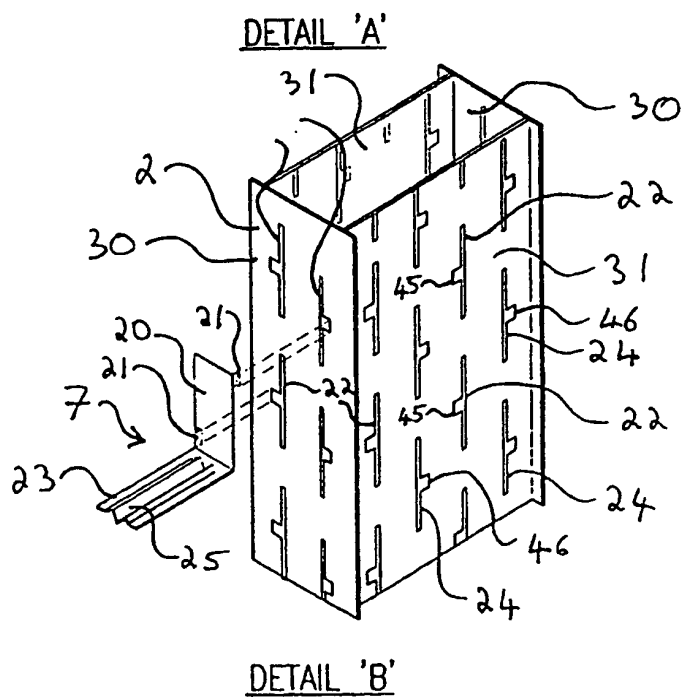


Figure 3

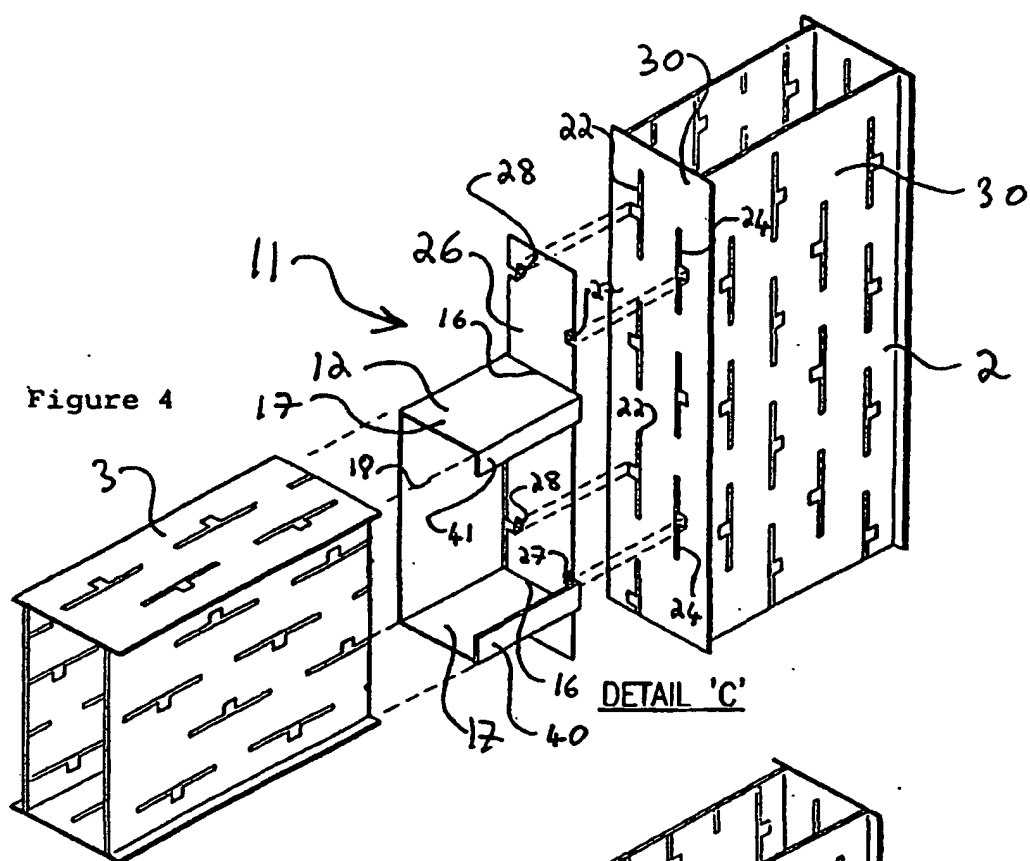
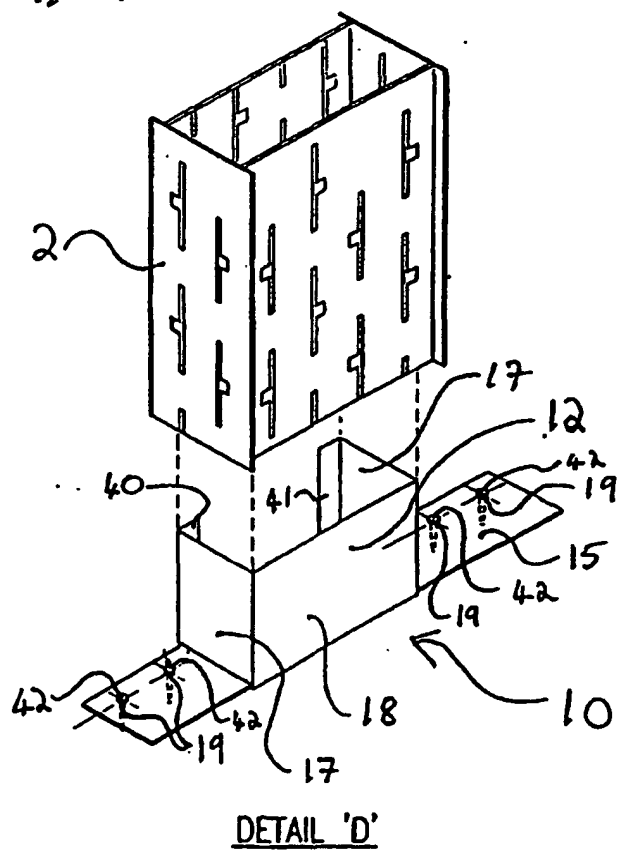


Figure 5



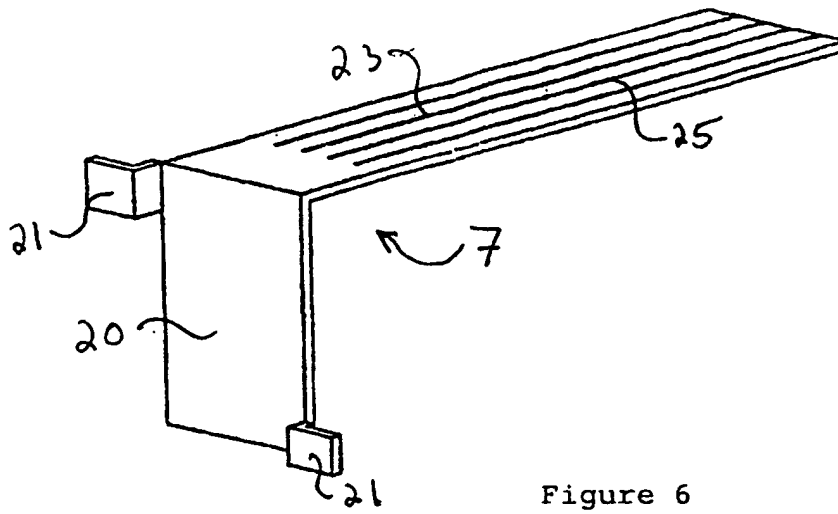


Figure 6

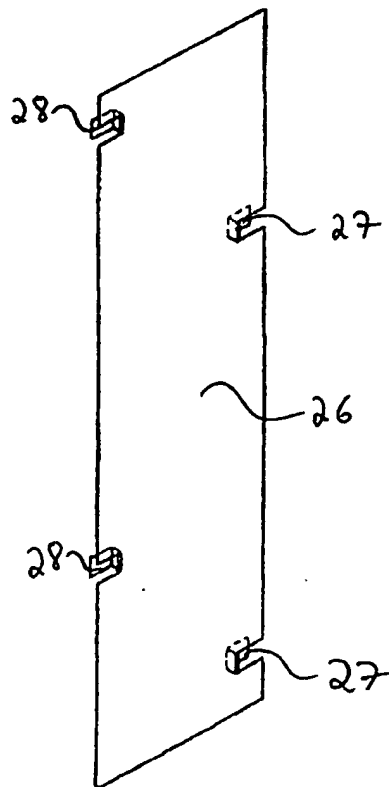


Figure 7